



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,131	03/31/2004	Xiuzhang James Zhang	839-1546	3717
30024 7590 09/13/2007 NIXON & VANDERHYE P.C. 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER VERDIER, CHRISTOPHER M	
			ART UNIT 3745	PAPER NUMBER
			MAIL DATE 09/13/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

MAILED
SEP 13 2007
GROUP 3700

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/813,131
Filing Date: March 31, 2004
Appellant(s): ZHANG ET AL.

Michael J. Keenan
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed July 9, 2007 appealing from the Office action
mailed April 14, 2006.

Art Unit: 3745

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

Art Unit: 3745

(7) Claims Appendix

Claim 10 contains substantial errors as presented in the Appendix to the brief.

Accordingly, claim 10 is correctly written in the Appendix to the Examiner's Answer.

(8) Evidence Relied Upon

5,771,577	GUPTA ET AL.	6-1998
3,542,486	KERCHER ET AL.	11-1970
6,383,602	FRIC ET AL.	5-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-2, 4-6, 7, and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 in view of Kercher 3,542,486. This rejection is set forth in the final rejection mailed April 14, 2006.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 and Kercher 3,542,486 as applied to claim 2 above, and further in view of Fric 6,383,602. This rejection is set forth in the final rejection mailed April 14, 2006.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 and Kercher 3,542,486 as applied to claim 7 above, and further in view of Fric 6,383,602. This rejection is set forth in the final rejection mailed April 14, 2006.

(10) Response to Argument

Appellant has argued concerning Gupta 5,771,577 that while Gupta discloses in figures 3A-3D and figure 4 other suitable passage shapes, and varies the inlet end of the passage end from a tapered configuration to a parallel wall configuration, in every case the outlet end is tapered or concavely curved in an outward direction to increase the outlet opening cross-sectional area. Appellant has further argued that Gupta does not disclose or suggest a film cooling hole with a concentric counterbore at an exit end where the hole and counterbore are parallel and connected by a 90 degree shoulder as required by independent claims 1, 10, and 13 of the instant application. Appellant has further argued that one of ordinary skill in the art would have understood from Gupta's disclosure that an outwardly tapered or concavely curved outlet is of significance, and that the disclosure does not embrace or suggest a concentric and parallel counterbore connected to the main passage by a 90 degree shoulder.

Concerning Kercher 3,542,486, Appellant has argued that while coolant holes or passages 50, 52 and 54 are provided to provide a film of cooling fluid that attaches itself to the exterior surface of the blade, Kercher is wholly silent with respect to any problem relating to the accumulation of excess coating material within the cooling hole, coatings are not even

Art Unit: 3745

mentioned, and Kercher's only concern is to diffuse the cooling flow at the exit end in order to minimize mixing with external hot gas.

Concerning the combination of Gupta and Kercher, Appellant has argued that this combination is only feasible utilizing impermissible hindsight gained from applicants' own disclosure, because Gupta discloses and describes various shapes and configurations for the exit or outlet ends of the cooling holes without mentioning the very simple but very effective configuration claimed in the instant application. Appellant has further argued that despite the fact that Kercher discloses a similar hole configuration, it is in a context other than surfaces coated with thermal barrier coatings, and that while the claimed hole configuration was known in other contexts, the fact that Gupta omitted this configuration from the several disclosed acceptable configurations in the context of the collection of excess thermal barrier coating material would likely be considered a teaching away from the present invention. Appellant has further argued that the proposed combination of Gupta and Kercher is not based on any suggestion or motivation provided by the prior art.

These arguments are respectfully disagreed with. Note that Gupta (figures 3A and 3B) and column 6, lines 2-15 teaches that the counter-bore 18 may be of various shapes and need not be circular, so long as the relationships of the invention of Gupta are maintained. Specifically, Gupta states "It should be understood, however, that the present invention can include passage and opening shapes other than such a taper so long as the relative opening sizes described above are maintained. Shown in the fragmentary sectional views A, B, C, and D of FIG. 3 and in FIG.

Art Unit: 3745

4 are some examples of other shapes. In FIG. 3 A and C, second opening 18 can be provided by an operation similar to countersinking in surface 20. In FIG. 3 B and D, second opening 18 can be provided by an operating which indents surface 20. As was mentioned above, the cross section of passage 12 and openings 14 and 18 need not be the same in shape nor need they be circular, so long as the relationships of the present invention are maintained. In the fragmentary sectional view of FIG. 4, passage 12 at second opening 18 has non-uniformly shaped walls. This is a form of countersink to accommodate the deposition of coating amount 22A within the passage without detrimental reduction in fluid flow through the passage, according to the present invention.” In figure 3A of Gupta, the counter-bore 18 has angled shoulders, while in figure 3B, the counter-bore has concavely curved shoulders. In view of this teaching in the primary reference to Gupta that the counter-bore 18 may be of various shapes and need not be circular, and the disclosure of Kercher 3,542,486 that film cooling holes may have a concentric counter-bore at the exit, with each hole and counter-bore being parallel and connected by a substantially 90 degree shoulder, it is believed that the claims are unpatentable under 35 USC 103(a) as being obvious over Gupta in view of Kercher. That is, it is believed that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the film cooling holes 12 of Gupta in figures 3A or 3B such that each hole at the exit end is formed with a concentric counter-bore, each hole and respective counter-bore being parallel and connected by a substantially 90 degree shoulder, as taught by Kercher, for the purpose of providing a diffusion section effective to reduce the efflux velocity of cooling fluid to a desired level.

With regard to Appellant's arguments that the claims are patentable because Kercher is silent with respect to any problem relating to the accumulation of excess coating material within the cooling hole, coatings are not even mentioned, and Kercher's only concern is to diffuse the cooling flow at the exit end in order to minimize mixing with external hot gas, because Gupta discloses and describes various shapes and configurations for the exit or outlet ends of the cooling holes without mentioning the very simple configuration claimed in the instant application, because Kercher discloses a similar hole configuration, but in a context other than surfaces coated with thermal barrier coatings, while the claimed hole configuration was known in other contexts, and because the fact that Gupta omitted this configuration from the several disclosed acceptable configurations in the context of the collection of excess thermal barrier coating material would likely be considered a teaching away from the present invention, these arguments are disagreed with for the following reason: It is noted that it does not matter that a reference does not solve the same problem that the claimed invention is solving or that the suggestion for combining the prior art is to achieve an end or purpose different from that which the applicants may have had in mind. *In re Beattie*, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992); *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 904 (1991); *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979). It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. *In re Kahn*, 441 F.3d 977, 987, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006); *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323, 76 USPQ2d 1662, 1685 (Fed. Cir. 2005); *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972). So long as there is a valid basis in the reference teachings themselves for the combination, a conclusion of

Art Unit: 3745

obviousness grounded on that basis is appropriate. Kercher is merely relied upon to teach that film cooling holes may have the conventional configuration of a concentric counter-bore at the exit, with each hole and counter-bore being parallel and connected by a substantially 90 degree shoulder, for the purpose of providing a diffusion section effective to reduce the efflux velocity of cooling fluid to a desired level.

Concerning Appellant's argument that the combination of Kercher and Gupta is only feasible utilizing impermissible hindsight gained from applicants' own disclosure, because Gupta discloses and describes various shapes and configurations for the exit or outlet ends of the cooling holes without mentioning the very simple but very effective configuration claimed in the instant application, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The proposed combination of Kercher and Gupta takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, since Gupta discloses the general idea of a turbine component/airfoil having film cooling holes with a counterbore and a coating applied to the turbine component/airfoil and Kercher teaches that film cooling holes may have the conventional configuration of a concentric counter-bore at the exit, with each hole and counter-bore being parallel and connected by a substantially 90 degree shoulder.

Concerning Appellant's argument that the proposed combination of Gupta and Kercher is not based on any suggestion or motivation provided by the prior art, the examiner respectfully disagrees. The final rejection clearly sets forth that the motivation for the proposed combination is taught by Kercher and is for the purpose of providing a diffusion section effective to reduce the efflux velocity of cooling fluid to a desired level (see Kercher, column 3, lines 67-72).

Concerning the rejection of claims 3 and 8 under 35 USC 103(a) as being unpatentable over Gupta 5,771,577 and Kercher 3,542,486 as applied to claims 2 and 7, respectively above, and further in view of Fric 6,383,602, Appellant has argued that Fric is cited for disclosing a counterbore depth of about 0.03 in., but that in Fric, the main passage of the cooling hole and the outlet end thereof are not parallel, and the resultant offset or misalignment is apparently intended to provide the desired type of disruption for the coolant flow. The examiner respectfully submits that Fric is a proper teaching reference for the subject matter of claims 3 and 8, since Fric (figures 5-8 and column 5, lines 35-48) teaches that film-cooled turbine components 40 may have cooling passages 46 with a counter-bore 51, 56 at the exit of the passages having a depth of about 0.030 inch, and that the fact that the main passage of the cooling hole and the outlet end thereof are not parallel does not negate the fact that Fric teaches the claimed counterbore depth of about 0.03 in. Fric also teaches that the counterbore depth disrupts coolant flow and provides greater cooling effectiveness.

Art Unit: 3745

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

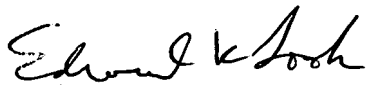
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Christopher Verdier
Primary Examiner
Art Unit 3745

Conferees:



Edward K. Look



Eric S. Keasel

Appendix to Examiner's Answer

Claim 10 contains substantial errors as presented in the Appendix to the brief.

Accordingly, claim 10 is correctly written as follows:

10. A gas turbine bucket having an airfoil portion and a shank portion, said airfoil portion having a plurality of film-cooling holes therein, each hole having a specified diameter and at an exit thereof is formed with a concentric counter-bore of predetermined depth, each said hole and respective counterbore being parallel and connected by a 90° shoulder; said airfoil portion having a coating applied thereto at least in a region, wherein the counter-bore provides an area for excess coating material to accumulate without reducing the specified diameter; and wherein said coating comprises a first bondcoat layer and a second thermal barrier coating layer.